

### **REMARKS/ARGUMENTS**

Applicants would like to thank the Examiner for the careful consideration given the present application. The application has been carefully reviewed in light of the Office action.

#### ***Claim Rejections – 35 USC § 101***

Claims 7 and 8 were rejected under 35 U.S.C. 101 for lacking patentable utility. The Examiner asserts that inserting oscillation angle information during blanking times of the ultrasound data streams provides no utility because if ultrasound data is not being recorded, its associated oscillation angle information will have no use during the image reconstruction.

In the Advisory Action, the Examiner notes that “it seems that inserting any type of data onto a storage location on a data array is an arbitrary process” and that “the utility of inserting oscillation information data between image data arrays is not understood.” Further, the Examiner states in the Advisory Action that “an image data array is being interpreted as a data table.”

The Examiner improperly interprets “image data array” as requiring a data table. The image data arrays are shown in FIG. 6 as part of a data stream. The image data within the image data arrays would have an order or arrangement and, therefore, be an array of data. However, the image data arrays need not be stored in a data table. The terms “data table” are not even found in the pending application.

The data stream shown in FIG. 6, which includes several image data arrays (e.g.,  $V_n$ ,  $V_{n+1}$ ,  $V_{n+2}$ ), has blanking times 72 located between the image data arrays. The image data arrays are intermittent and are separated by the blanking times 72. The blanking times 72 are periods between image data arrays.

It is noted that blanking times (known also as blanking periods or blanking intervals) have been previously used in television signals (e.g., vertical blanking interval), and that useful data has been inserted into the blanking intervals of television signals. For example, character data or other data can be superimposed on the vertical blanking interval of the television signal so that data independent of the television image can be reproduced.

Turning to claims 7 and 8, the recited subject matter makes use of the blanking times by adding oscillation angle information to the data stream at the blanking times. The oscillation angle information could correspond to a previous (e.g., an immediately preceding) image data array or a subsequent (e.g., an immediately following) image data array. In this way, the oscillation angle information corresponds to the image data arrays and can be used to display a three-dimensional image. See applicants' second embodiment, which is addressed on pages 22-25 of the application and on figures 5 and 6. Applicants respectfully submit that the subject matter of each pending claim provides specific and substantial utility and request that the rejections under 35 U.S.C. 101 be withdrawn.

#### ***Claim Rejections – 35 USC § 112***

Claims 2, 7 and 8 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The Examiner asserts that "it is not clear is what meant by 'information inserted between the image data arrays' or for what purpose this step is performed." In the Advisory Action, the Examiner questions "how can 'time' be located between image data arrays?"

The American Heritage Dictionary of the English Language defines time as an interval separating two points on a nonspatial continuum in which events occur in apparently irreversible succession from the past through the present to the future. See <http://education.yahoo.com/reference/dictionary/entry/time>. The definition of time is consistent

with the use of “blanking times” in the present application. The blanking times are intervals separating intermittent data arrays in a data stream, as shown in FIG. 6. Additionally, for the reasons discussed above with respect to television signals, the meaning of blanking times located between data would be clearly understood by one of ordinary skill in the art. Applicants respectfully submit that claims 2, 7 and 8 are discernible to one of ordinary skill in the art and request that the rejections under 35 U.S.C. 112 be withdrawn.

***Claim Rejections – 35 USC § 102***

Claims 1, 4, 5 and 7 were rejected under 35 U.S.C. 102(b) as being anticipated by Mochizuki. Amended claim 1 requires data streams comprising image data arrays and corresponding oscillation angle information. The oscillation angle information comprises data inserted between the image data arrays at blanking time of the data streams.

Mochizuki does not teach data streams having both image data arrays and oscillation angle information comprising data inserted between the image data arrays at blanking times of the data streams. As noted by the Examiner in the Advisory Action, “the applied references do not teach blanking times.”

Mochizuki teaches a three-dimensional memory 108 for storing echo data (concerning a three-dimensional area) in such a manner that the three-dimensional position of the echo data corresponds to each address in the memory (7:25-32). Writing of the echo data into the memory is controlled in response to an angle signal from an angle detector. However, Mochizuki does not teach to include angle information from its angle detector in its three-dimensional memory 108. Merely controlling the writing of echo data into a memory in response to an angle signal does not teach a data stream comprising both image data arrays and corresponding oscillation angle information, wherein the oscillation angle information comprises data inserted between the

image data arrays at blanking times of the data streams. Indeed, Mochizuki does not even teach a blanking time. Moreover, it would not be obvious to one of ordinary skill in the art to modify Mochizuki by inserting data (i.e., oscillation angle information) between image data arrays, because the ordering of the echo data in Mochizuki's memory would render such added data superfluous.

The claimed subject matter provides an advantage over Mochizuki in that positional information as inserted data is positively included with the image data. The positional information would be present regardless of where the data streams are stored, regardless of whether the data streams are stored in contiguous memory locations, etc. Mochizuki, meanwhile, is limited to its three-dimensional memory 108 for storing echo data in such a manner that the three-dimensional position of the echo data corresponds to each address in the memory. The claimed subject matter would not be so limited.

In view of the deficiencies of Mochizuki, applicants respectfully submit that claim 1 is not anticipated by and is allowable over Mochizuki.

Claim 4 recites, "a delay means for delaying position information in the oscillation direction of the ultrasonic transducer unit by a processing time of the scanning conversion means...wherein the delay means outputs the delayed position information to the three-dimensional image processing means." The Office action, as best understood by the applicants, appears to be citing Mochizuki's controller 102 for both the claimed delay means and the scanning conversion means. The Office action cites Mochizuki's three-dimensional image processor 110 for the claimed three-dimensional image processing means. The controller 102 controls the writing of echo data in the memory 108. However, as can be seen in Fig. 8, the controller 102 does not output anything to the three-dimensional image processor 110.

Therefore, Mochizuki does not teach a delay means that *outputs* delayed position information *to a three-dimensional image processing means* (as required by claim 4). Applicants respectfully submit that claim 4 is allowable over Mochizuki.

Claim 5 recites, “a scanning conversion means for receiving image data comprising image data arrays and further receiving oscillation angle information as data inserted between the image data arrays.” Mochizuki does not teach oscillation angle information as data inserted between image data arrays. Mochizuki teaches a three-dimensional memory 108 for storing echo data (concerning a three-dimensional area) in such a manner that the three-dimensional position of the echo data corresponds to each address in the memory. Moreover, it would not be obvious to one of ordinary skill in the art to modify Mochizuki by inserting data (i.e., oscillation angle information) between image data arrays, because the ordering of the echo data in Mochizuki’s memory would render such added data superfluous. Applicants respectfully submit that claim 5 is allowable over Mochizuki.

Amended claim 7 depends from claim 5. Claim 7 further requires that “said data is inserted between the image data arrays at blanking times located between the image data arrays.” Mochizuki does not teach any blanking times, and claim 7 is allowable over Mochizuki for at least this reason.

### ***Claim Rejections – 35 USC § 103***

Claims 2 and 8 were rejected under 35 U.S.C. 103(a) as being unpatentable over Mochizuki. Claim 2 recites, “wherein the image data comprises image data arrays and the oscillation angle information is data inserted between the image data arrays by the oscillation angle information adding means.” Mochizuki does not teach oscillation angle information as data inserted between image data arrays. As noted above, Mochizuki teaches a three-

dimensional memory 108 for storing echo data (concerning a three-dimensional area) in such a manner that the three-dimensional position of the echo data corresponds to each address in the memory. It would not be obvious to one of ordinary skill in the art to modify Mochizuki by inserting data (i.e., oscillation angle information) between image data arrays, because the ordering of the echo data in Mochizuki's memory would render such added data superfluous. In view of the differences between the subject matter of claim 2 and Mochizuki, applicants respectfully submit that claim 2 is allowable over Mochizuki.

Claim 8 depends from claim 2. Claim 8 further requires that "said data is inserted at blanking times located between the image data arrays." As noted above, Mochizuki does not teach any blanking times. In view of the differences between the subject matter of claim 8 and Mochizuki, applicants respectfully submit that claim 8 is allowable over Mochizuki.

Claims 3 and 6 were rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Mochizuki and Raitzer. Claims 3 and 6 depend from claims 1 and 2, respectively. Applicants respectfully submit that the above-discussed deficiencies of Mochizuki are not corrected by Raitzer, and that claims 3 and 6 are allowable over the combination of Mochizuki and Raitzer.

In light of the foregoing, it is respectfully submitted that the present application is in condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 16-0820, our Order No.: NIHE-41412.

Respectfully submitted,  
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